Maria Giambanco Final Lesson Plan

Class: Living Environment

Unit: Human Impact of the Environment

Topic: Human Generated Waste

Big Idea: Human activities are altering the planet on a scale comparable to major natural processes of the past.

Essential Question: Should individuals take responsibility for humanities impact on the environment?

NOTE: This is a 2 period lesson using the 5 E method.

Aim: Why should we care about water quality?

Materials:

* Water samples in cups or beakers: bottled water, water with vinegar or lemon juice added, water with baking soda, cloudy water from a pond, water with dish or laundry detergent added (phosphates), water with fertilizer (Miracle Gro works well), water that has been boiled and then sealed & cooled (no oxygen), ice cold water, warm water, salty water
* Water test kits
* Copies of note-taking sheet
* Projector or smartboard
* White boards and Markers

Lesson Overview: Lesson is an introduction to how human activities impact water. Students will learn about different ways water quality is measured and make connections to how human activities impacts water quality. Students will think about how their actions impact water quality in preparation for the unit’s performance task, a persuasive essay addressing the unit’s essential question.

Learning Objectives:

* Students discuss pollution, what it means, and whether different water uses should have different standards.
* Students practice using water quality tests in the classroom on prepared samples.
* Students complete a water quality note-taking chart based on what they learned.

Standards:

* STANDARD 4: Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.
* CCSS.ELA-Literacy.RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
* CCSS.ELA-Literacy: Interpreting complex diagrams, writing complex claim, using evidence from diagrams to support a claim

Danielson Rubric Component:

* 3c: student perform several tests that are related to the topic of water quality, multiple opportunities for students to speak with each other about the topic built into the lesson

Differentiation: This lesson visuals, verbal and written supports that identify how students will be working throughout the lesson. This specifically includes the voice volume scale and the modes on each PPT slide. Students will be working in pairs. Checklists, a graphic organizer for organizing review information and post-its are used to help support students. Specifically, the post-its are utilized to create on the spot checklists for students who require additional support and also as a tool for our questions parking lot.

Procedure:

1. Do Now (10 min)- Engage/ Explore

🡪On trays for each table make sets of several samples of water and label them with letters: One should be tap water, one a bottled water, one should smell different, and one should be an odd color.

Directions: In table groups. Study the water samples on your table and make observations (REMEMBER WE NEVER TASTE ANYTHING IN THE LAB!!!). Write a summary of your group’s discussion to share with the class.

Today’s Group Roles:

Seat 1: Reader

Seat 2: Scribe

Seat 3: Presenter

Seat 4 Materials Manager

Discussion Starters:

* Which, if any, of these waters would you drink? Why would/ wouldn’t you drink the waters?
* What would a weird smell or color could tell about the water? If water is clear and doesn’t smell, is it safe to drink?
* Would you swim in the water? Is drinking water different from water you swim in? 🡪*Students might point out that you can swim in salt water but not drink it*.
  + What about the animals that live in bodies of water such as lakes and rivers? What do they need to survive? What factors are important for them?
* ***Differentiation: Modes man and voice volume scale on the smart board***
* ***Students work in groups and Use of white boards encourage students to write their thought due to it’s non-permanent nature= low risk***
* ***Verbal prompting for students to get started***
* ***Project the discussion starter questions***

1. Mini-Lesson (15 min)- Explain

Dissolved Oxygen - the presence of *oxygen molecules* in water. 🡪make note that the oxygen in water is NOT DO.

* Enters water though diffusion from surrounding air and photosynthesis

***CTQ: Why is having a lot of dissolved oxygen in a boy of water such as a pond or ocean important?*** 🡪 BOTH aquatic plants and animals need oxygen to survive

***CTQ: Using your knowledge of biology, what factor may affect the amount of dissolved oxygen in water***? 🡪 altitude, temperature, speed of water movement, addition of wastes, vegetation

**TURN AND TALK: 🡪**Project the fish and sewage graph from the 2011 regents exam Q56)

***CTQ: What do you observe about the trout and carp population over time?*** 🡪 trout pops decrease and carp pops increase

***CTQ: What factor may result in these changes?*** 🡪 increase in the amount of sewage released into the river

***CTQ: Give an possible explanation for the difference you see in the fish populations.*** 🡪 possible answers: carp can survive with much less oxygen than trout and salmon; in the les DO environment carp can out compete trout, carp are able to eat the sewage and trout/ salmon can’t

pH - the measure of acidity of a solution. Acids are produced by the presence of hydrogen ions, and bases are produced by the presence of hydroxide ions.

* pH affects many chemical and biological processes in water.
* Measured on a scale from 0 to 12
* A solution with equal
* Hydrogen and hydroxide ions would have a pH of 7
* A decrease of one unit on the pH scale is the result of a 10 fold increase in hydrogen ions.

***CTQ: How might a change in pH affect a river?*** 🡪 It changes the availability of different nutrients and metals in the

Water, Metals that leech from the soils when pH changes especially affect immature stages of aquatic insects and fish.

***• Differentiation: Modes man and voice volume scale on the smart board***

1. Group Work (15 min)- Elaborate

🡪Divide students into lab groups (table groups if a full class)

* Have a sample of water from the local waterway (pier) for each group.
* Tests:

• pH

• Dissolved Oxygen

• Phosphate

• Nitrate

* Nitrite

• Chloride

• Turbidity

• Conductivity

* Review lab safety.
* Each group will conduct a different water quality test and be given a reading about the test, why it is done, human activities that can affect that parameter and actions that can be taken to reduce human impacts on that factor.

Directions: The material manger should collect a water sample and choose one test from the front of the room. Perform the water quality tests according to the directions enclosed in each kit and record their results on your worksheet. As a group read the section of the worksheet that has to do with the test that your group is performing. Use Hochman symbols to fill in the notes section of the worksheet. Be sure to take notes of the following information as you will be presenting it to the class:

* What is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?
* Why do we test for \_\_\_\_\_\_\_\_\_\_\_\_\_?
* What should \_\_\_\_\_\_\_\_\_\_\_\_\_ be?
* What problems occur if \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is not “normal”?
* What human activities contribute to a change in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?
* What actions can be taken to reduce the impact of human activities on \_\_\_\_\_\_\_\_\_\_\_\_?
* ***Differentiation: For faster moving groups assign two test, for slower moving groups assign PH, nitrate or nitrate as student have performed those test multiple times.***
* ***Students work in mixed groups.***
* ***Activity is differentiated for multimodal learners.***

1. Day 1 Summary (5 min) -Take away

Directions: As a group discuss the following question and then write your answer on your white boards. When you are done call the teacher over to discuss your answer.

***CTQ: Why is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ important to the water quality of lake, rivers and oceans?***

* ***Differentiation: Modes man and voice volume scale on the smart board***
* ***Students discuss the work in groups before writing so that even struggling students have something to write***
* ***Verbal prompting for students to get started***

1. Day 2 Do Now ( 15 min) Preparations for Presentations

Directions: Each group will be given 3 minutes to share the test they performed, their test results, the reason why the test is performed, what problems arise when that parameter is not “normal”, the human activities that affect that parameter and how human can reduce their impact on that parameter

1. Presentation ( 15 minutes)- Evaluation

* ***Differentiation: Modes man and voice volume scale on the smart board***
* ***Students work in groups***

1. Summary (15 minutes)- final performance task water quality pre-write

* Give each pair of students a copy of the Global Water Crisis picture

Direction: With your partner, study the picture and discuss the answers to the following questions. After your discussion write what YOU think about each of the question on your worksheet. The information you write will be used as notes for your final performance task so do a good job.

***CTQ: Why is water quality important to humans?***

***CTQ: What are some concerns that human face in regards to water quality?***

***CTQ: What, if any actions do you take that can affect water quality (good and bad) and availability?***

***CTQ: Should individuals take actions to reduce their effect on water quality? Why or Why not?***

* ***Differentiation: Modes man and voice volume scale on the smart board***
* ***Use of image gives all students an entry point into the activity***

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| Do Now:   * Student began do now with minimal prompting * Pair Work   + Student wrote a summary of their discussion on their individual worksheet   + *Student performed their assigned daily role*   + *Student kept work are neat!*   Mini- lesson  • Student wrote notes using Hochman symbols  • Student engaged in turn and talk discussion  Group Work:   * Student read directions ***before*** asking for any help * Student completed their assigned daily role * Student wrote notes addressing the prompts on their worksheet   Day 1 Summary:   * Student wrote a response to the summary prompt * Engaged in the class debrief discussion   Presentation:   * Presentation addresses all the prompts * Student participated in preparing for the presentation * Student spoke or in some way participated in the presentation   Summary Day 2:   * Student discussed the image and questions with their partner. * Student wrote down a response to each question on their worksheet.   EXTRA CREDIT:   * Student answered or responded to an answer for a CTQ (EXTRA CREDIT) | Do Now:  \_\_\_\_\_\_\_\_\_\_\_\_/ 12  Lesson:  \_\_\_\_\_\_\_\_\_\_\_\_/ 6  Group Work:  \_\_\_\_\_\_\_\_\_\_\_\_\_/ 9  Day 1 Summary:  \_\_\_\_\_\_\_\_\_\_\_\_\_/ 6  Presentation:  \_\_\_\_\_\_\_\_\_\_\_/9  Summary Day 2:  \_\_\_\_\_\_\_\_\_\_\_\_\_/ 6  EXTRA CREDIT:  \_\_\_\_\_\_\_\_\_\_\_\_/ 5 |
| **Total Score: \_\_\_\_\_\_\_\_\_/48 (53)** | |

